

**Amendments to the Claims:**

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Canceled)
2. (Currently Amended) ~~The controller for a gas concentration sensor according to claim 1, further comprising~~ A controller for a gas concentration sensor that generates an output correlating with an oxygen concentration in a detected gas, said controller comprising:  
impedance detection means for applying an impedance detection voltage to said gas concentration sensor to detect a device impedance of said gas concentration sensor;  
reverse voltage application means for applying a voltage as generated by said gas concentration sensor itself or a voltage that shifts from said same voltage toward an opposite direction against a direction of said impedance detection voltage to said gas concentration sensor for a specified period of time after said impedance detection voltage is applied to said gas concentration sensor; and  
reverse voltage application period setup means for increasing said specified period of time with an increase in said device impedance.
3. (Currently Amended) The controller for a gas concentration sensor according to ~~claim 1~~claim 2, further comprising reverse voltage application period setup means for decreasing said specified period of time with a decrease in ~~the difference~~a difference between said impedance detection voltage and the voltage generated by said gas concentration sensor itself.
- 4-8. (Canceled)